

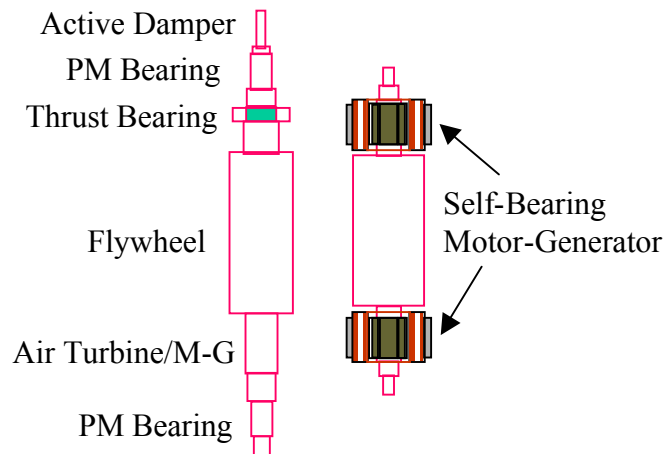
## Self-Bearing Motor-Generator for Flywheels

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**Proposal No.: 03-E2.08-8674**

### Identification and Significance of Innovation

The innovation proposed for a self-bearing motor-generator (M-G) will achieve speeds above 30,000 rpm, moving the technology to a new frontier, not only for the motor but the generator functions as well. As applied to a flywheel energy storage system, the concept replaces the permanent-magnet (PM) bearings, conventional M-G, as well as the need for the active damper. The self-bearing function is implemented with a proportional integral derivative control and has adjustable damping as in conventional active magnetic bearings. With improved efficiencies and reliability, the self-bearing M-G will serve as a modular building-block technology for the power management and distribution systems used in observation platforms for earth science missions.



The proposed self-bearing motor-generator (right) shortens rotor length and simplifies existing rotor structure (left) to allow for higher speed, more reliable operation.

### Technical Objectives

The objective is to design and build a demonstrator machine and test it to 20,000 rpm to show the feasibility of the proposed self-bearing M-G.

### Work Plan

The work plan has the following tasks:

Task 1: Design of Self-Bearing Motor-Generator

Task 2: Design & Fabrication of Demonstrator Test Rig & Sample M-G

Task 3: System Tests

Task 4: Final Report

### NASA Applications

Spaced-based flywheels and motor-driven actuators

### Non-NASA Applications

Small compact motors and motor-generators for power conversion and storage

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